
QPC250 Release Link Trunk Card

Introduction

The QPC250 Release Link Trunk Card is a peripheral equipment (PE) device that can be installed in any peripheral shelf or NT8D13 Peripheral Equipment (PE) Module. The release link trunk card interfaces two analog trunk lines to the Meridian 1 switch. Each trunk is independently configurable using the Trunk Administration program (LD 14).

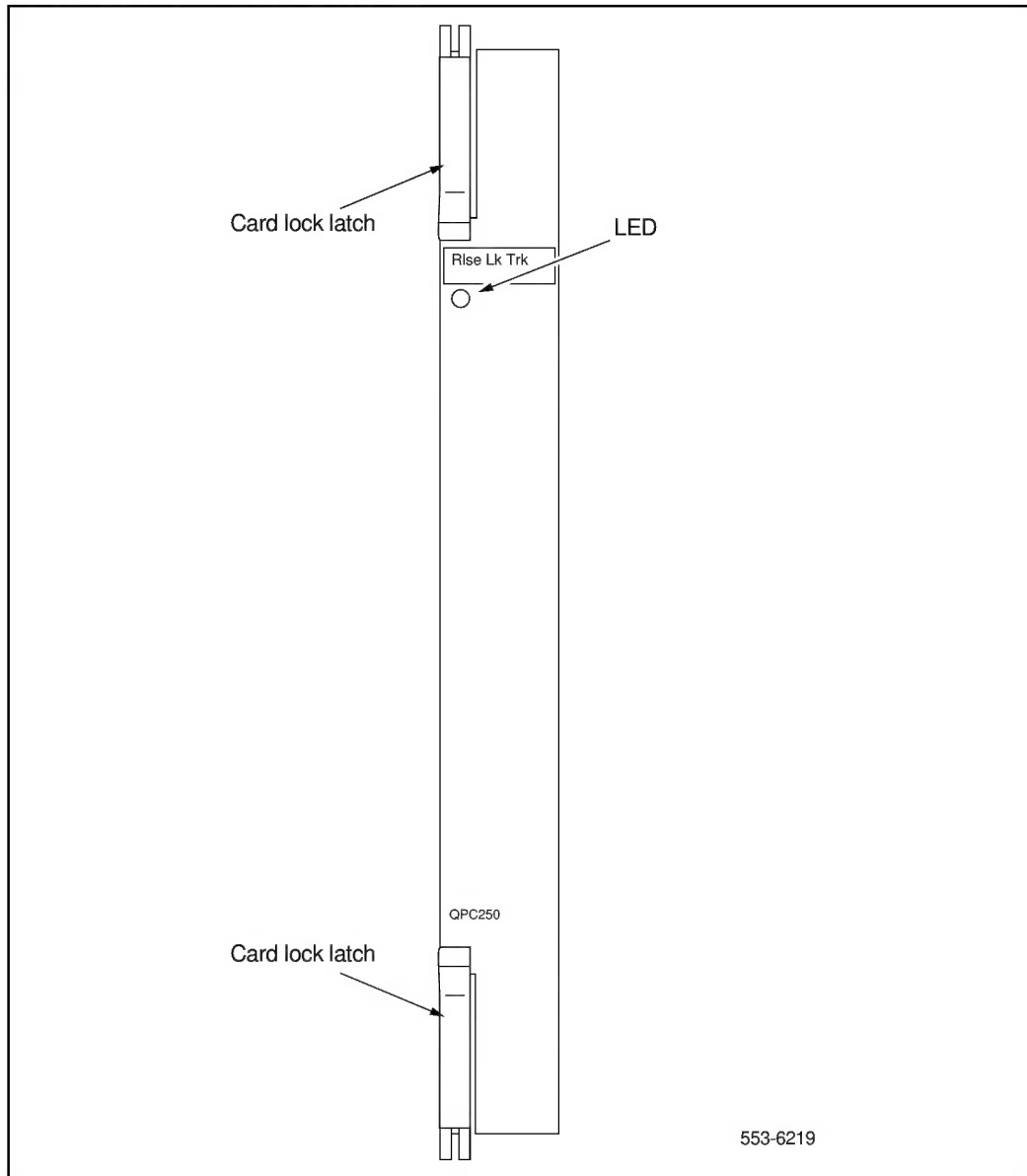
Physical description

The release link trunk card mounts in any PE slot. The two trunk circuits and common multiplexing circuitry are mounted on a 31.74 cm by 25.4 cm (12.5 in. by 10 in.) printed circuit board.

The release link trunk card connects to the backplane through an 80-pin connector shroud. The backplane is then cabled to the input/output (I/O) panel, which is cabled to the main distribution frame (MDF) by 25-pin cables. Trunk lines connect to the card at the MDF. See *Meridian 1 system installation procedures* (553-3001-210) for termination and cross connect information.

The faceplate of the card is equipped with a red light emitting diode (LED) (see [Figure 93](#)). The LED should only be lit if there is a problem with the card. If the LED operates in any other manner, such as continually flashing or remaining weakly lit, the card should be replaced.

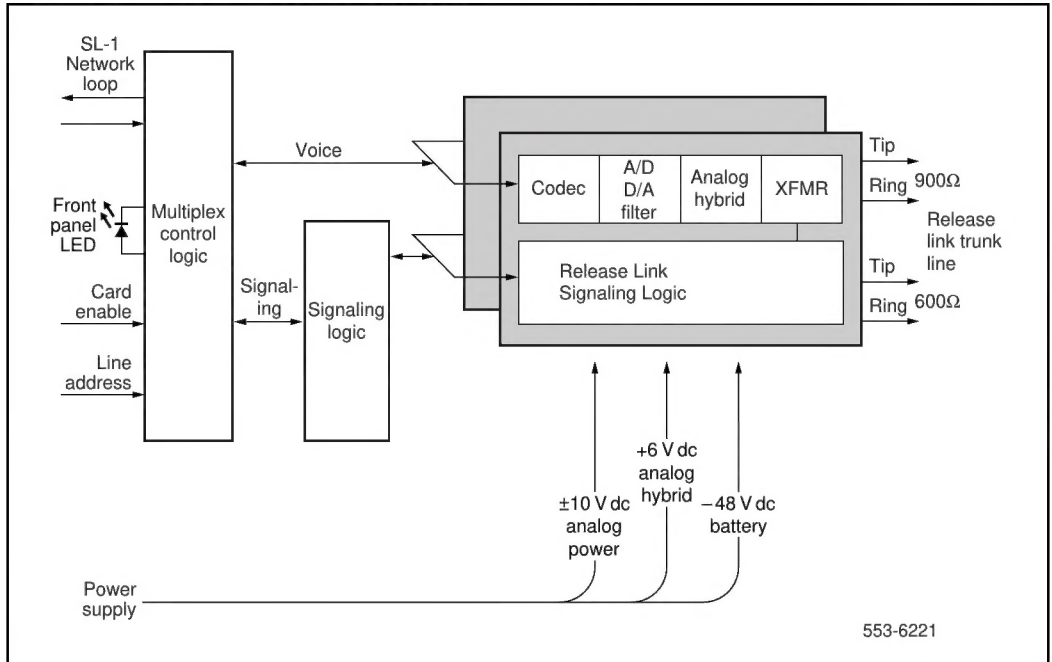
Figure 93
Release link trunk card—faceplate



Functional description

Figure 94 shows a block diagram of the major functions contained on the release link trunk card. Each of these functions are described on the following pages.

Figure 94
Release link trunk card—block diagram



Card interfaces

A release link trunk card is used to interface a remote site to the main site when the Centralized Attendant Service (CAS) feature is required. The remote location is equipped with a QPC250 RLT Card that interfaces with a QPC70 CO Trunk Card, QPC450 CO/FX/WATS Trunk Card, or NT8D14 Universal Trunk Card at the main location. This application is limited to a maximum loop resistance of 1400 ohms.

A release link trunk circuit consists of a trunk circuit at a remote private branch exchange (site) to be served by a CAS attendant, and an interfacing trunk circuit at the main site where the CAS attendant is located. The type of circuit pack that can be used at either the remote site or main site depends on the distance between the remote site and the main site.

The QPC250 RLT Card contains two identical trunk circuits and common circuitry mounted on a printed circuit board. The card can be inserted into any peripheral equipment (PE) shelf slot. Each circuit on a QPC250 RLT Card at a remote site interfaces with a CO trunk circuit at the main site to allow access to the CAS attendant.

Trunk interface units

The release link trunk contains two identical trunk units (also called circuits). Each unit provides impedance matching and a balance network in a signal transformer/analog hybrid unit.

Two codecs are provided for performing A/D and D/A conversion of trunk analog voiceband signals to digital PCM signals. Each codec supports one trunk interface unit.

Multiplex control

The multiplex control logic is common to both channels. This logic interfaces the individual trunk circuits to the peripheral bus signaling channel. Circuits are provided in the multiplex control logic to retime the digital signals received from the peripheral bus. Other circuits decode the address information contained on the peripheral bus to enable the individual trunk circuits during their selected timeslots. Logic is also provided to enable or disable the front panel LED to indicate the service state of the card. The multiplex control logic is discussed in detail in "Peripheral equipment" on page 22.

Operation

Operation at the remote site

Idle state

The release link trunk (RLT) at the remote site is connected to a central office (CO) trunk circuit at the main site by tip and ring leads. The RLT circuit provides open tip and ring leads during the idle state.

Outgoing seizure

Upon seizure of the RLT by the remote site, the RLT provides ground on the tip lead and battery on the ring lead, and waits 256 ms.

If the DC resistance across the tip and ring leads is greater than 20 K ohms, the site provides steady ringing superimposed with -48 V battery through up to 220 ohms of resistance on the ring lead. If the DC resistance across the tip and ring leads is less than 1300 ohms, then the CO trunk at the main site has not released from a previous call, and the RLT is locked out until the main site removes the loop. A trunk error message (TRK 241) is printed and another RLT circuit is used.

The ringing supply at the remote site should generate AC ringing voltage between 75- and 100-V rms at a frequency of 20 Hz (± 3 Hz).

Detecting answer supervision

The RLT detects a decrease in DC resistance across the tip and ring leads from at least 20 K ohms to 1300 ohms or less, as an off hook signal from the main site equipment. If the off hook signal persists for at least 256 ms, the signal is an answer supervision. The RLT trips ringing within 100 ms when it detects the answer signal. Ringing can be tripped during both the silent and ringing intervals.

Talking state

After answer, and until disconnect, the RLT provides ground through up to 425 ohms of resistance on the tip lead, and -48 V battery through up to 425 ohms of resistance on the ring lead.

Flash signal

The CAS attendant at the main site controls the RLT by the console signal remote (SIG REM) key or release destination (RLS DEST) key. The operation of this key sends a timed flash signal to the RLT. The RLT functions controlled by flashing are a request for a Digitone receiver for the calling party and cancellation of a prior attendant request (release destination).

The RLT recognizes an increase in the DC resistance across the tip and ring leads from <1300 ohms to 20 K ohms or more as an on-hook signal. The on hook signal should be timed for 200 ms to 1.0 second. If the conductor loop resistance changes back to low resistance (off hook) in this interval, the RLT interprets that as a flash signal from the CAS attendant.

The RLT is seized for an incoming CO call, a dial “0”, an intercept call, or a hold recall after the CAS attendant has talked to the calling party. The detection of the first flash signal after the RLT has been seized prompts the connection of a Digitone receiver to the RLT, and splits the calling party away from the RLT.

A dial tone is sent to the CAS attendant when the Digitone receiver is available to receive address signals. Dial tone is removed within 50 ms of the start of dialing the first address character. If the RLT detects a subsequent flash signal while connected to a receiver (i.e., attendant flash to clear the receiver), it disconnects the receiver and returns to its initial state (i.e., connected to the calling party). When the receiver has translated the dialed address characters, different confirmation tones are sent to the CAS attendant, depending on the status of the called telephone.

Disconnect

The RLT recognizes and times an increase in the DC resistance across the tip and ring leads from <1300 ohms to 20 K ohms or more as an on-hook from the CAS attendant. If the on hook lasts longer than the flash timer, the RLT interprets the change as a disconnect.

After interpreting disconnect from the attendant, the RLT opens the tip and ring leads to the interfacing CO trunk at the main site, sending a disconnect signal to the main site. To prevent the RLT from being seized from a new call before the CO trunk at the main site has released, the RLT provides a busy guard timer.

Operation at the main site

Idle state

There is a resistance of >20 K ohms across the tip and ring leads at the CO trunk interface during the idle state.

Incoming seizure

The CO trunk at the main site detects seizure by an RLT at a remote site when the RLT provides simultaneously:

- a ground through 1.2 K ohms of resistance or less on the tip lead
- ringing with superimposed -48 V battery on the ring lead through a resistance of 1.2 K ohms or less

The maximum delay of ringing must be less than 5 seconds after ground and battery detection, and the ringing must last more than 640 ms. If any one of the above conditions is not satisfied, the call is not presented to the CAS attendant.

Disconnect before the attendant answers

Before the attendant answers the call, tone ringing should be 2 seconds on and 4 seconds off. If there is no ringing for longer than a value programmed into a programmable timer, the call is withdrawn from presentation to the attendant.

CAS attendant answers

When the CAS attendant answers, a resistance of 800 ohms or less is applied across the tip and ring conductors at the CO trunk. A two-way transmission path between the RLT and the CAS attendant is established within 160 ms to avoid clipping initial speech. The circuit maintains the low resistance across the tip and ring leads until the RLT is flashed or disconnected by the attendant.

Flash signal

When the CAS attendant presses the signal remote (SIG REM) key on the console, a timed flash (on hook) signal is sent to the remote site. The flash signal changes the resistance across the tip and ring leads from low (off-hook) to high (on hook resistance for a timed interval. The flash signal should be 600 ms (± 200 ms) with the preferred signal being 512 ms.

After the CAS attendant has pressed the SIG REM key, a Digitone receiver at the remote end is connected to the RLT and dial tone is sent to the attendant as confirmation that an idle receiver has been connected. Digits dialed after receiving dial tone are outpulsed as soon as an outpulser is available.

When the CAS attendant wishes to release from a prior request (i.e., a call extended to a busy telephone), the release destination (RLS DEST) key on the console is pressed. Operation of this key sends a timed flash to the remote site, and connects the attendant to the original calling party.

Disconnect

The CO trunk at the main site interprets removal of ground from the tip lead and -48 V battery from the ring lead that persists for more than 1 second as a disconnect signal from the RLT. After interpreting disconnect from the remote site, the CO trunk disconnects from the CAS attendant, and removes the loop across the tip and ring leads that acts as a disconnect supervision.

When the CAS attendant disconnects, the resistance of 800 ohms or less applied to the tip and ring leads at the CO trunk changes to 20 K ohms or more. This is interpreted as an on hook signal to the RLT at the remote site.

Electrical specifications

This section gives the electrical specifications for the release link trunk card.

Trunk interface electrical characteristics

Table 59 gives the electrical characteristics for the trunk interface units on the release link trunk card.

Table 59
Electrical specifications

Characteristic	Specification
Impedance	900 ohms
Loop limit	1400 ohms at nominal -48 V
Leakage resistance	30,000 ohms
Ring trip	During silent or ringing intervals
Ringing voltage	85-V rms, 20 Hz superimposed on -48 V dc
Signaling	Ground start
Supervision	Normal battery conditions are applied (-48 V to ring, ground to tip) when the interfacing CO trunk circuit is to be seized
Power input from shelf	± 10 V dc, ± 6 V dc, -48 V dc 85-V rms, 20 Hz, superimposed on -48 V dc
Effective loss	0.5 dB at 1020 Hz (pads in), -1.5 dB (pads out)
Insertion loss	1 dB
Answer supervision	Does not reverse battery when the terminating end answers
Disconnect supervision	Does not momentarily open-circuit the tip and ring leads on disconnect

Power requirements

[Table 60](#) lists the typical power requirements for the release link trunk card.

Table 60
Power requirements

Voltage	Tolerance	Current (typical)
+10 V dc	± 5%	30 mA
+10 V dc	± 5%	30 mA
±6 V dc	± 1%	8 mA
±6 V dc	± 1%	8 mA
−48 V dc	± 12%	100 mA

Foreign and surge voltage protections

When telephone lines connected to the trunk circuit are exposed to foreign voltages by direct contact or induction (e.g., power line crosses or lightning), protection devices must be installed on the customer's premises. These devices must be capable of providing a path to ground from tip and ring for foreign voltages that exceed 600 V peak.

Environmental specifications

[Table 61](#) lists the environmental specifications for the release link trunk card.

Table 61
Environmental specifications

Parameter	Specifications
Operating temperature	0° to +60° C (+32 to +140° F), ambient
Operating humidity	5 to 95% RH (noncondensing)
Storage temperature	−40° to +70° C (−40° to +158° F)

Connector pin assignments

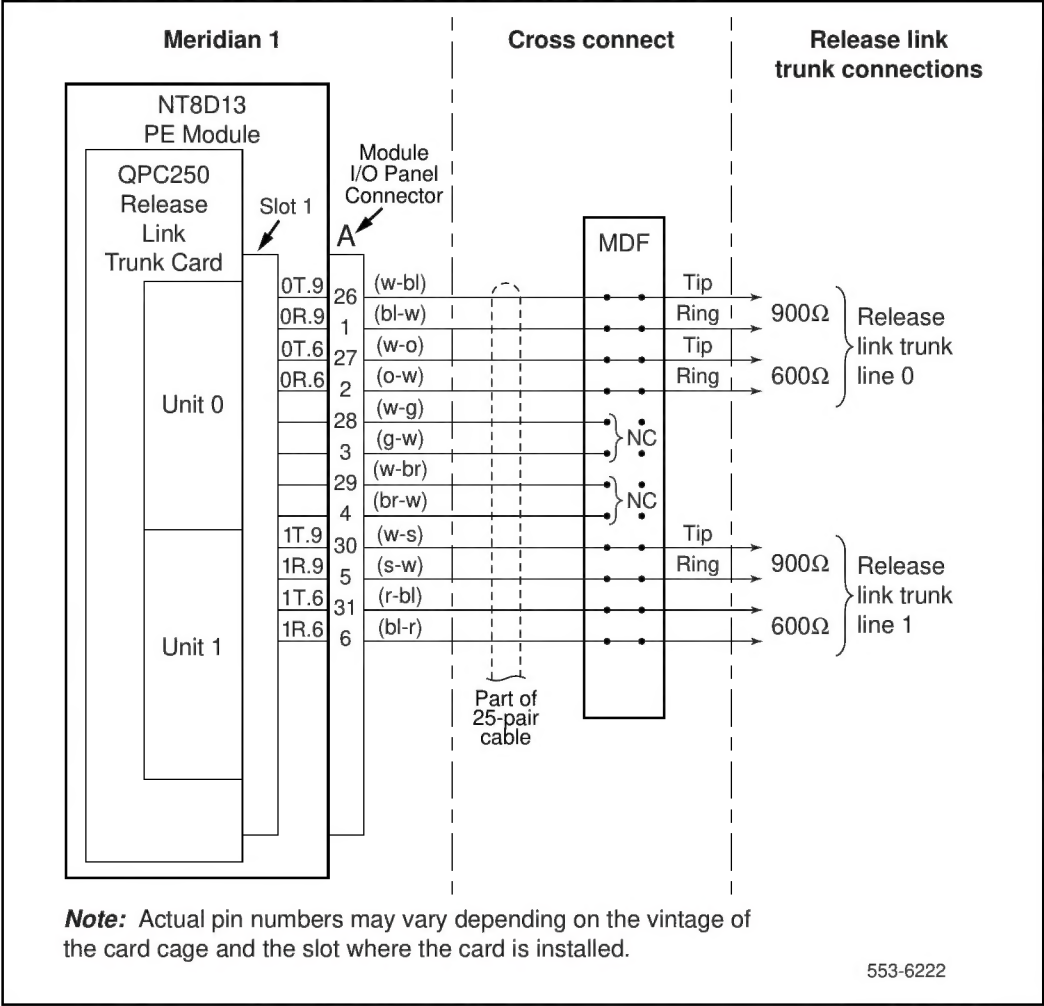
The release link trunk card brings the analog trunks to the PE backplane through an 80-pin connector shroud. The backplane is cabled to the input/output (I/O) panel on the rear of the module, which is then connected to the main distribution frame (MDF) by 25-pair cables.

Telephone trunks connect to the release link trunk card at the MDF using a wiring plan similar to that used for line cards. A typical connection example is shown in [Figure 95](#) and a list of the connections to the release link trunk card is shown in [Table 62](#). See *Meridian 1 system installation procedures* (553-3001-210) for complete I/O panel connector information and wire assignments for each tip/ring pair

Table 62
Release link trunk card—backplane pinouts

Connector Pin	Signal	Unit
36A	Tip, 900 Ω	0
37A	Ring, 900 Ω	
38A	Tip, 600 Ω	
39A	Ring, 600 Ω	
2A	Tip, 900 Ω	1
3A	Ring, 900 Ω	
4A	Tip, 600 Ω	
5A	Ring, 600 Ω	

Figure 95
 Release link trunk card—typical cross connection example



Configuration

This section gives information on configuring the release link trunk card.

Switch and jumper settings

The trunk type for each unit on the card is selected by software service change entries at the system terminal. There are no switches or jumpers on the release link trunk card. An outline of the card is shown in [Figure 96](#).

Service change entries

The trunk type, features, and signaling arrangement for each trunk are selected by making service change entries in the Trunk Administration program (LD 14). The Centralized Attendant Service is enabled using the Customer Data Block program (LD 15). A CAS trunk is added or changed using the Trunk Route Administration program (LD 16). Refer to the *Meridian 1 X11 input/output guide* for LD 14, LD 15, and LD 16 service change instructions. Refer to *Centralized Attendant Service description and engineering* (553-2681-100) for more information on the Centralized Attendant Service.

Figure 96
Release link trunk card—switch and jumper settings

